

## CLAIMS

What is claimed is:

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1. A micro-optical component, comprising:  
an optical element for interacting with an optical beam; and  
a mounting structure for attaching the optical element to an optical bench;  
wherein the optical element is solid-phase welded to the mounting structure.
2. A micro-optical component as claimed in claim 1, wherein the optical element is thermocompression bonded to the mounting structure.
- 10 3. A micro-optical component as claimed in claim 1, wherein the optical element is thermosonically bonded to the mounting structure.
4. A micro-optical component as claimed in claim 1, wherein the optical element is ultrasonically welded to the mounting structure.
- 15 5. A micro-optical component as claimed in claim 1, wherein the optical element comprises a lens substrate.
6. A micro-optical component as claimed in claim 1, wherein the optical element comprises a microelectromechanical device.
- 20 7. A micro-optical component as claimed in claim 1, wherein the optical element comprises a Fabry-Perot tunable filter.
8. A micro-optical component as claimed in claim 1, wherein the mounting structure is fabricated from a metal.
9. A micro-optical component as claimed in claim 1, wherein the mounting structure is metal coated.

10. A micro-optical component as claimed in claim 1, wherein the mounting structure is coated with a thermocompression bond metal.

11. A micro-optical component as claimed in claim 10, wherein the bond metal comprises gold.

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12. A micro-optical component as claimed in claim 1, further comprising depositing bond metal bumps on the mounting structure.

13. A micro-optical component as claimed in claim 1, further comprising depositing bond metal bumps on the optical element.

14. A micro-optical system, comprising:

10 an optical element for interacting with an optical beam;  
a mounting structure, the optical element being solid-phase welded to the mounting structure; and  
an optical bench, the mounting structure being solder bonded to the optical bench.

15. A micro-optical system as claimed in claim 14, wherein the optical element is thermocompression bonded to the mounting structure.

16. A micro-optical system as claimed in claim 14, wherein the optical element is thermosonically bonded to the mounting structure.

17. A micro-optical system as claimed in claim 14, wherein the optical element is ultrasonically welded to the mounting structure.

20 18. A micro-optical system as claimed in claim 14, wherein the optical element comprises a lens substrate.

19. A micro-optical system as claimed in claim 14, wherein the optical element comprises a microelectromechanical device.

20. A micro-optical system as claimed in claim 14, wherein the optical element comprises a Fabry-Perot tunable filter.

21. A micro-optical system as claimed in claim 14, wherein the mounting structure is fabricated from a metal.

5 22. A micro-optical system as claimed in claim 14, wherein the mounting structure is metal coated.

(6+) 23. A micro-optical system as claimed in claim 14, wherein the mounting structure is coated with a thermocompression bond metal.

10 24. A micro-optical system as claimed in claim 23, wherein the bond metal comprises gold.

25. A micro-optical system as claimed in claim 14, further comprising depositing bond metal bumps on the mounting structure.

15 26. A micro-optical system as claimed in claim 14, further comprising depositing bond metal bumps on the optical element.

27. A process for assembling an optical system, the process comprising:  
solid-phase welding an optical element to a mounting structure; and then  
attaching the mounting structure to an optical bench.

28. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises thermocompression bonding the mounting structure and the optical element.

20 29. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises thermosonically bonding the mounting structure and the optical element.

30. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises ultrasonically bonding the mounting structure and the optical element.

5 31. A process as claimed in claim 27, wherein the step of attaching the mounting structure to the optical bench comprises solder bonding the mounting structure to the optical bench.

32. A process as claimed in claim 27, wherein the step of attaching the mounting structure to the optical bench comprises:

10 depositing solder material on solder mating surfaces of the mounting structure and the optical bench;

reflowing the solder material to join the mating surfaces.

33. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises coating weld mating surfaces of the optical element and the mounting structure with bond material.

15 34. A process as claimed in claim 27, wherein the step of solid-phase welding the optical element to the mounting structure comprises coating weld mating surfaces of the optical element and the mounting structure with gold.